Authority NND 735022

File - Test Section, Inf. Board

FIRST PARTIAL

REPORT

of

The Infantry Board

No. 1644

U. S. CARBINE, CALIBER .30, M1, WITH SELECTIVE SINGLE SHOT OR FULL AUTOMATIC FIRING MECHANISM

Also see: 1644-B

FORT BENNING, GEORGIA

30 June 1944

24725—Benning, Ga., 9-16-42—2,000

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IB-474.2

29 JUN 1944

SUBJECT: U. S. Carbine, Caliber .30, M1, with Selective Single Shot or Full Automatic Firing Mechanism (FIRST PARTIAL REPORT).

TO: The Chief, Ground Requirements Section, Army Ground Forces, Army War College, Washington, D. C.

1. Authority and Purpose.

a. A formal directive has not been received by The Infantry Board for test of the subject carbine. Captain Cooper, O.D., personally delivered this carbine, 15 June 1944. The Infantry Board proceeded to test the carbine as shown in detail in this report.

b. Tests were designed to determine:

(1) Physical characteristics (Test No. 1).

(2) Results obtained by familiarization fire including single shots, short bursts and full automatic 15-round bursts (Test No. 2).

(3) Hits obtainable at 100 yards (standing) firing short bursts (Test No. 3).

(4) Hits obtained at 50 yards (prone) firing full automatic 15-round bursts (Test No. 4).

(5) Comparative numbers of hits obtainable at 50 yards (standing) firing full automatic 15-round bursts with a wire to stabilize the muzzle and firing without this stabilization (Test No. 5).

(6) Frequency of malfunctions and their causes (Test No. 6).

2. Description of Materiel.

The subject carbine is a modified standard carbine. The modification consists of the incorporation of a selective single shot or full automatic firing mechanism. Selection is made by a change lever on the upper left side of the receiver. Aside from the change lever, the subject carbine externally appears the same as the standard carbine.

Authority NND 735022

3. Factual Background.

The U.S. Carbine, Caliber .30, M1 is accepted as a highly successful weapon for the initial purpose for which it was designed. The potentialities of this weapon has led it into fields beyond the purpose of its original mission. It has been put to uses that were never intended for this weapon such as grenade launching and bayonet combat. It has met these requirements successfully. It is now being subjected to automatic fire and possibly bipod mounting or field expedient mounts. The carbine is undergoing a cycle of applications common in the life of firearms.

4. Facts indicated by the tests.

a. That the subject carbine has the same dimensions, approximately the same weight and uses the same magazines as the standard carbine (Test No. 1).

b. That the subject carbine is capable of delivering semi-automatic, or automatic fire (either short bursts or full automatic) by the simple movement of a change lever by the operator (Test No. 2).

c. That the following results were obtained under the conditions shown:

[Te]st [N]o.	Firer's position	Range (yds)	Type of fire	Size of panel 12' x 12'	6' x 6'	No. rounds fired	Hits	% Hits
2	Standing	100	Semi-automatic	X		45	45	100.0
2	Standing	100	Short bursts	X		105	64	60.9
3	Standing	100	Short bursts	X		300	162	54.0
2	Standing	100	Full automatic	X		75	48	64.0
4	Prone	50	Full automatic		X	315	203	64.4
5	Standing	50	Full automatic		X	135	55	48.0

d. That the initial attempts to use a stabilizing wire on the barrel produces slightly less hits than without the wire (Test No. 5).

e. That 23 malfunctions occurred when firing 1312 rounds in this test. These malfunctions were due to:

Authority NND 735022

Failures to feed ---------	16
Failures to extract -------	1
Failures to eject --------	6
Total -----	23

(Test No. 6)

f. That inspection by Ordnance and Infantry Board personnel at the conclusion of these tests indicates no excessive wear and tear and that the subject carbine is capable of further effective use without overhaul. Total rounds fired to date: these tests 1312, prior to these tests approximately 1750 - total 3062.

5. Discussion.

The subject carbine has performed very well in this test in fire delivery possibilities and mechanical functioning.

Short bursts and full automatic fire are not to be visualized as the customary way of using the subject carbine even though the selective automatic fire mechanism is incorporated in its construction. This short burst and full automatic fire availability, while successful, is a fire capability indicated for use in an emergency and not as habitual technique. Furthermore, emphasis is to be placed on the fact that the subject carbine is in a different class of weapons than the so-called submachine guns and machine pistols. These latter weapons shoot pistol cartridges. The subject carbine shoots a distinct rifle cartridge. Comparisons must be selected and made with care otherwise confusion and erroneous conclusions will result. The common class of submachine gun and machine pistol have barrels less than 12" in length. Their muzzle velocity at best is 1500 f/s but usually less for the common 9mm pistol cartridge and decidedly less for the caliber .45 automatic pistol cartridge. The 7.63mm Mauser pistol cartridge may attain 1500 f/s in submachine guns. The ballistics of the caliber .30 carbine cartridge require no further discussion here.

6. Conclusions. The Infantry Board concludes:

a. That the incorporation of the selective single shot or full automatic firing mechanism into the construction of the carbine improves the usefulness of the carbine.

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b. That the subject carbine as submitted is a successful and effective Infantry weapon.

c. That an Infantry requirement exists for the subject carbine.

d. That the number of malfunctions are not excessive considering the type of weapon.

e. That the accuracy obtained indicates possibilities of highly desired fire power in emergencies.

f. That even if the total fire life of the subject carbine were limited to 3062 rounds this would represent a reasonable total "built in" fire life for a combat weapon of this class considering other wear-and-tear factors contributing to the necessity of overhauling the weapon.

g. That the subject carbine is capable of further effective use without overhaul.

7. Recommendations. The Infantry Board recommends:

a. That the subject carbine be standardized and replace the present standard carbine.

b. That carbines now in process of manufacture be equipped with the selective single shot or full automatic firing mechanism.

c. That carbines now in storage and in the hands of troops be modified (by use of conversion kits or otherwise).

d. That priority for the converted carbine be given to Infantry in active theaters of operation.

e. That 30 shot magazines be developed for subject carbine.

INGOMAR M. OSETH,
Colonel, Infantry,
Director.

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REPORT of TEST

U. S. CARBINE, CALIBER .30, M1, WITH SELECTIVE SINGLE SHOT OR FULL AUTOMATIC FIRING MECHANISM (FIRST PARTIAL REPORT)

TEST SECTION
THE INFANTRY BOARD

FORT BENNING, GEORGIA

Submitted to
THE INFANTRY BOARD

Copy No. 6 Date 28 June 1944

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TEST SECTION
THE INFANTRY BOARD
FORT BENNING, GEORGIA

28 JUNE 1944

SUBJECT: REPORT OF TEST OF U. S. CARBINE, CALIBER .30, M1, WITH SELECTIVE SINGLE SHOT OR FULL AUTOMATIC FIRING MECHANISM (FIRST PARTIAL REPORT)

TO: THE PRESIDENT, THE INFANTRY BOARD, FORT BENNING, GEORGIA

Authority NND 735022

I-N-D-E-X

Paragraph No.	Subject	Page No.
1.	AUTHORITY	10
2.	INTRODUCTORY INFORMATION	10
3.	PURPOSE OF TEST	11
4.	DETAILS OF TESTS AND RESULTS	12
	Test No. 1: Physical Characteristics of the subject carbine	12
	Test No. 2: Determining results obtained during familiarization firing at 100 yards (standing)	13
	Test No. 3: Determining hits obtained when firing the carbine in short bursts at 100 yards (standing)	15
	Test No. 4: Determining hits obtained when firing the carbine in 15 shot automatic bursts at 50 yards (prone)	16
	Test No. 5: Determining hits when firing the carbine (standing) in 15 shot automatic bursts with and without a wire to hold the muzzle down	17
	Test No. 6: To record malfunctions obtained with the carbine	19
5.	RECAPITULATION	22

Appendix

"A"	Memorandum, The Infantry Board, IB-474.2, 20 June 1944	24

Authority NND 735022

1. Authority: Memorandum, The Infantry Board, IB-474.2, 20 June 1944, Subject: U.S. Carbine, Caliber .30, M1, with selective single shot or full automatic firing mechanism (Appendix "A").

2. Introductory Information.

a. Subject carbine is a standard carbine which has been modified by the addition of a few parts and by the changing of a few standard parts. By means of a change lever on the upper left side of the receiver, the mechanism may be set to give semi-automatic fire or to give full automatic fire. Aside from the change lever, the carbine externally looks like the standard M1 carbine.

b. The sear has been modified by the addition of a lug on the front top portion. A sear release has been added, which is held in the trigger mechanism by the hammer pin. A rear extension of this release can bear on the lug on the sear. A long actuating lever is pivoted to the pin which holds the front of the trigger guard to the receiver. The rear of the lever bears on the front of the sear release, while the front end can bear against the bottom of the slide.

c. When the mechanism is set for automatic fire, and the trigger is held back, as the slide goes forward, at the last portion of its forward movement, it cams down the front end of the actuating lever. This in turn forces the rear end of the lever up, which forces the front end of the sear release up. This action forces the rear end and extension of the sear release down, against the lug on the sear, which forces the sear out of the hammer notch and permits the hammer to fall.

d. The stud on which the actuating lever is pivoted is eccentric relative to the body of the pin. The change lever is fastened to the left end of the pin. When the change lever is pulled back to the semi-automatic position, the actuating lever is moved down so that it does not bear on the slide or sear release, thus permitting normal semi-automatic fire.

e. During full automatic fire, if the trigger is released, the sear moves to the rear over the top of the trigger. When it moves back, the stud against which the sear release bears also moves back until it clears the rear extension of the sear release. Then, although the sear release is still actuated by the slide, the rear extension of the sear release cannot strike any part of the sear and firing stops.

Authority NND 735022

3. Purpose of Test.

To determine:

Functioning and accuracy at ranges up to 400 yards

When fired semi-automatic,
When fired in short bursts,
When fired in 15 round automatic bursts,

From the standing position,
From the prone position,
With a light bipod,
With improvised rests.

Other pertinent data.

Authority NND 735022

4. Details of Tests and Results.

Test No. 1

a. Purpose: To determine physical characteristics of the subject carbine.

b. Method: By weighing and measuring.

c. Results:

Weight, w/o magazine (lbs)	5.26	
Overall length (in)	35.8	
Barrel length (in)	18.0	
Length taken down (in)	28.4	(2 pieces)
Magazine capacity	15	
Weight of empty magazine (lbs)	0.18	
Weight of loaded magazine (lbs)	0.60	(15 rounds)
Weight of 150 rounds in magazines (lbs)	5.96	(10 magazines)
Weight of 100 rounds in cartons (lbs)	2.89	(2 boxes)
Sight radius (in)	21.5	(approx)

Authority NND 735022

Test No. 2

a. Purpose: To determine results obtained during familiarization firing at 100 yards (standing).

b. Method: Various officers fired the carbine with various types of fire.

c. Results:

Range: 100 yards.
Target: 12' x 12' panel, with kneeling silhouette centered.

(1) Semi-automatic.

Shooter	Hits 12' x 12' panel	Hits Silhouette	Total shots fired
Crossman	15	12	15
Crossman	15	14	15
Snyder	15	14	15
Total	45	40	45
Average	15	13	

(2) Short bursts (3 to 5 rounds)

Shooter	Hits 12' x 12' panel	Hits Silhouette	Total shots fired
Crossman	6	0	15
	7	0	15
	11	Not taken	15
Snyder	14	5	15
	8	0	15
	10	0	15
Sheldon	8	1	15
Total	64	6	105
Average	9.1	1	

Authority NND 735022

(3) Full automatic bursts, 15 shots.

Shooter	Hits 12' x 12' panel	Silhouette	Total shots fired
Grossman	10	1	15
	8	0	15
	8	Not taken	15
Snyder	10	0	15
	12	0	15
Total	48	1	75
Average	9.6	0.3	

(4) Total rounds fired:

Semi-automatic - 45
Short bursts - 105
Full automatic - 75

Total - - 225

Authority NND 735022

Test No. 3

a. Purpose: To determine hits obtained when firing the carbine in short bursts at 100 yards (standing).

b. Method: Ten men fired 2 groups of 15 shots each in short bursts with the carbine.

c. Results:

Range: 100 yards.
Target: 12' x 12' panel, with kneeling silhouette centered.
Length of bursts: 1 to 5 rounds.

Shooter	Hits on 12' x 12' panel	Hits on Silhouette	Total shots fired
Stein	8	1	15
	9	0	15
Papish	6	4	15
	9	2	15
Radke	7	0	15
	11	0	15
Szufnarowski	7	0	15
	7	1	15
Johnson	7	1	15
	12	3	15
Henderson	5	1	15
	6	3	15
Alvis	7	1	15
	11	2	15
Hockinbury	7	1	15
	5	3	15
Spelarich	12	0	15
	11	1	15
Hasinbuhler	8	0	15
	7	0	15
Total	162	24	300
Average	8.1	1.2	

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Test No. 4

a. Purpose: To determine hits obtained when firing the carbine in 15 shot automatic bursts at 50 yards (prone).

b. Method: Ten men fired 2 groups of 15 shots full automatic each (except one man who shot 3 groups) with the carbine.

c. Results:

Range: 50 yards.
Target: 6'x6' panel, with kneeling silhouette centered.
Position: Prone, gun free of the ground or other artificial support.
Length of burst: 15 shots full automatic, except in case of stoppages.

Shooter	Hits on 6' x 6' panel	Silhouette	Total shots fired
Stein	12	1	15
	15	13	15
Papish	8	2	15
	10	2	15
Johnson	8	2	15
	11	1	15
Henderson	10	1	15
	3	1	15
	7	2	15
Alvis	15	2	15
	15	2	15
Radke	12	2	15
	5	2	15
Szafnarowski	10	4	15
	9	2	15
Hockinbury	3	1	15
	4	2	15
Spolarich	13	5	15
	13	0	15
Hasinbuhler	10	4	15
	10	4	15
Total	203	55	315
Average	9.7	2.6	

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Test No. 5

a. Purpose: To determine hits when firing the carbine (standing) in 15 shot automatic bursts with and without a wire to hold the muzzle down.

b. Method: A 7' length of W-130 wire was tied to the muzzle. Men stepped on the wire and adjusted the length to hold the muzzle down. A 15 shot automatic burst was fired using the wire to keep the muzzle down. A 15 shot burst was fired without the wire. Four men used the wire on the first burst, while 4 men fired without the wire on the first burst.

c. Results:

Range: 50 yards.
Target: 6'x6' panel, with kneeling silhouette centered.

			Hits on		Total	
Shooter	Group	Wire	6'x6' panel	Silhouette	shots fired	Remarks
Grossman	1	w/wire	8	1	15	
	2	w/wire	8	5	15	
	3	w/o wire	10	3	15	
	4	w/o wire	13	6	15	
Szafarowski	1	w/wire	5	0	15	
	2	w/o wire	6	1	15	
Spolarich	1	w/wire	6	4	15	2 bursts
	2	w/o wire	4	2	15	2 bursts
Johnson	1	w/wire	5	2	15	2 bursts
	2	w/o wire	10	3	15	2 bursts
Alvis	1	w/o wire	1	1	15	
	2	w/wire	7	3	15	
Henderson	1	w/o wire	3	1	15	
	2	w/wire	6	3	15	
Papish	1	w/o wire	4	0	15	
	2	w/wire	1	0	15	

Authority NND 735022

c. Results: (Continued)

Shooter	Group	Wire	Hits on 6'x6' panel	Hits on Silhouette	Total shots fired	Remarks
Hasinbuhler	1	w/wire	3	2	15	
	2	w/o wire	4	0	15	
Total			104	37	270	
Average			5.8	2.1		
Total hits with wire			49	20		
Average			5.4	2.2		
Total hits without wire			55	17		
Average			6.1	1.9		

Number rounds fired with wire 135
Number rounds fired without wire
wire 135

Authority NND 735022

Test No. 5

a. Purpose: To record malfunctions obtained with the carbine.

b. Method: A record was kept of all firing and all stoppages.

c. Results:

Log of rounds fired and malfunctions with subject carbine.

Note: Rounds fired by subject carbine prior to this test: Capt. Cooper stated that prior to receipt by The Infantry Board this carbine had fired approximately 1500 rounds in mixed fires. Prior to this current test on 16 June 44 The Infantry Board fired 250 rounds in mixed fires. Total - 1750 rounds.

Date	No. rounds fired Semi-automatic	Auto.	Total	Remarks
23 June 1944			1750 (prior to 23 Jun 44)	Gun stripped and examined. Barrel and bolt examined by Ordnance. New gas piston and lock nut installed. All parts appear to be satisfactory.
do	15	52	67	In automatic fire, 7th empty case pulled 1/2" out of chamber and remained, while bolt came to rear and tried to feed new cartridge.
	15	82	97	Gun stripped and examined. Condition satisfactory.
	44	112	156	In semi-auto fire, bolt rode over 15th round and did not feed. Fed by hand and failed to eject properly: cartridge case caught crossways between slide and receiver ring.
	45	120	165	Failure to feed: loaded cartridge cocked in receiver.
	45	121	166	Failure to feed: bolt closed on empty chamber.
	45	122	167	Failure to feed: bolt closed on empty chamber.
	45	125	170	Failure to feed: cartridge cocked in receiver.
	45	126	171	Failure to feed: bolt closed on empty chamber.

Note: It is possible that the last 5 stoppages were due to a defective magazine. This magazine was discarded after these stoppages.

Authority NND 735022

Date	No. rounds fired Semi-automatic	Auto.	Total	Remarks
	45	185	230	Empty shell caught crossways between slide and receiver.
	45	195	240	Empty shell caught crossways between slide and receiver.
	45	231	276	Failure to feed: bolt closed on empty chamber.
	45	245	290	Failure to feed: bolt picked up loaded round but did not force it into the chamber.
	45	215	260	Failure to feed: bolt closed on empty chamber.
	45	216	261	Failure to feed: bolt closed on empty chamber.
	45	292	337	Stripped and examined. Cleaned and oiled. Condition satisfactory.
24 June 1944	45	442	487	Bolt held open on last round by empty case lying on top of magazine.
	45	501	546	Failure to feed: bolt closed on empty chamber.
	45	502	547	Failure to feed: bolt closed on empty chamber.

Note: The magazine which gave the last two stoppages was discarded.

Date	Semi-automatic	Auto.	Total	Remarks
	45	502	547	Stripped and examined. Condition satisfactory.
	45	592	637	Failure to feed: bolt closed on empty chamber on 15th round.
	45	682	727	Failure to feed: bolt closed on empty chamber on 15th round.
	45	794	839	Empty shell caught between slide and receiver ring.
	45	832	877	Stripped and examined. Condition satisfactory.
	45	921	966	Failure to feed: Bolt closed on empty chamber on 14th round.
	45	922	967	Failure to feed: Bolt closed on empty chamber on 15th round.
	45	1110	1155	Empty shell caught between slide and receiver ring.
	45	1267	1312	Stripped and examined. Condition satisfactory.

Re-checked by Ordnance. Condition satisfactory. No parts appeared damaged. Carbine suitable for further firing.

Authority NND 735022

Summary of malfunctions:

Failure to feed ------	16
Failure to extract ---	1
Failure to eject ----	6
Total	23

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5. Recapitulation.

Test No.	No. rounds fired: Semi-automatic	Short Bursts (3 – 5 rds.)	15 rd. full auto	Hits on 12'x12' panel	Hits on Silhouette	Total hits on 12'x12' panel	Hits on 6'x6' panel	Hits on Silhouette	Total hits on 6'x6' panel
2 100 yds. standing)	45			5	40	45			
		105		58	6 + possibility of hits of one silhouette group not recorded	64			
			75	47	1 + above possibility	48			
3 100 yds. tanding)		300		138	24	162			
4 0 yds. prone)			315				148	55	203
5 0 yds. anding. Testg wire to hold wn muzzle of rbine)			270				w/wire 29	w/wire 20	w/wire 49
							w/o wire 38	w/o wire 17	w/o wire 55
tal	45	405	660	248	71 +	319	215	92	307

tal rounds fired in this test:

		Total rounds fired prior to this test	Aggregate
Semi-automatic ----	45		
Short bursts ----	405		
Full automatic ----	660		
Miscellaneous ----	202		
Total	1312	1750	3062

Authority NND 735022

Malfunctions due to:

Failure to feed ----	16
Failure to extract ---	1
Failure to eject ----	6
Total ----	23

EDWARD B. CROSSMAN,
Major, Infantry,
Test Officer.

I concur in the above report:

WILLIAM C. RUTHERFORD,
Lt. Colonel, Infantry,
Chief of Test Section.